Government Guarantees and Banks' Earnings Management

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  - Potential cash infusions in high marginal utility states.

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  - Asset pricing effects on different securities:
    - Equity securities (O'Hara and Shaw, 1990; Gandhi and Lustig, 2015; Gandhi, Lustig, and Plazzi, 2017).
    - Debt securities (Acharya, Aginer, and Warburton, 2016).
    - Put options (Kelly, Lustig, and Van Nieuwerburgh, 2016).
  - Banks' risk taking (Stern and Feldman, 2004; Acharya and Yorulmazer, 2007, 2008), equity issuance (Baron, 2017), and financial stability (Allen, Carletti, Goldstein, and Leonello, 2017).

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- Do government guarantees also affect the quality of the information reported by banks?
  - The quality of bank's financial reporting is central in mitigating the adverse consequences of economic downturns (Acharya and Ryan, 2016).

Banks' Earnings Management

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- Banks use reporting discretion to manage earnings and circumvent capital requirements (Ahmed, Takeda, and Thomas, 1999; Huizinga and Laeven, 2012; Beatty and Liao, 2014; Jiang, Levine, and Lin, 2016).
  - Do government guarantees affect marginal benefits (and costs) of banks' earnings management?

Summary

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- **Model:** Variant of Trueman and Titman (1988).
  - Key features:
    - Smoothing quantity is an endogenous continuous variable.
    - Introduce government guarantees as an exogenous parameter that censors the left tail of "riskier" banks.
  - Objective: to model how government guarantees alter marginal (capital market) benefits and (monitoring) costs of managing earnings.
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- **Empirical Settings:** Two *unrelated* events representing *shocks to government guarantees* which are plausibly orthogonal to a reasonable set of bank-specific omitted variables that affect banks' financial reporting.

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Landesbanken	**Eurozone Creation**
Removal of *explicit* guarantees to debtholders.	*Increasing implicit* guarantees to banks' capital providers.
Well identified but *limited generalizability*.	*Confounded* with other variables but *generalizable* to a larger set of banks.

Model Setting

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- **Setting:** Same spirit of Trueman and Titman (1988) — a bank manager who needs to raise capital (debt) and can engage in earnings smoothing to alter the investor's perceptions of risk.
  - Two periods; two types of banks (A is less risky than B).
  - Bank manager knows her own type (A or B) and chooses the optimal amount of earnings smoothing s^* that optimizes the capital market benefits (investor's subjective probability of the bank being type A) and costs (reporting scrutiny).
  - Investor doesn't observe the bank type or the actual earnings (x_1 and x_2) — just the reported earnings (x_1^s and x_2^s).

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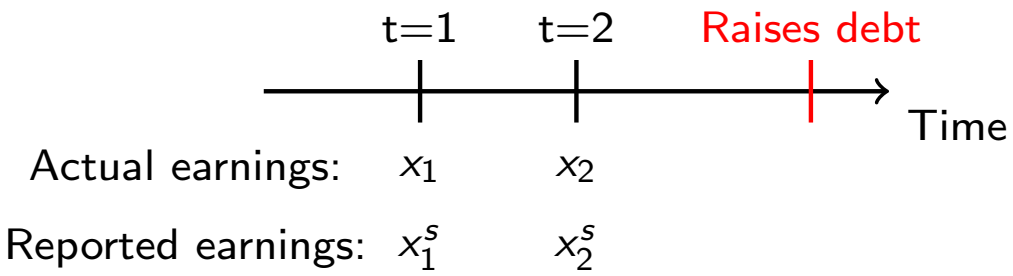

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- Assumptions:
  - Actual earnings x_t^i follow a normal distribution where $E[\tilde{x}_t^i] = \mu$ (for $i = A, B$) and $Var[\tilde{x}_t^B] = \sigma_B^2 > \sigma_A^2 = Var[\tilde{x}_t^A]$.
  - By construction we have:

$$x_1^s = (1 - s)x_1 + s\mu$$
$$x_2^s = x_2 - s(\mu - x_1)$$

  - The investor prices the debt of a type A (B) bank as B_A (B_B). The proceeds raised depends on investor's subjective belief of a bank being type A:

$$\begin{aligned} B\left(p'_A(x_1^s, x_2^s)\right) &= p'_A(x_1^s, x_2^s)B_A + \left(1 - p'_A(x_1^s, x_2^s)\right)B_B \\ &= p'_A(x_1^s, x_2^s)(B_A - B_B) + B_B \end{aligned}$$

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- Bank manager's choice:
  $s^* = \arg\max E[y(x_1, \tilde{x}_2, s)](B_A - B_B) + B_B - K(s)$
  - Where $p'_A(x_1^s, \tilde{x}_2^s) = y(x_1, \tilde{x}_2, s)$

The Manager's Optimal Smoothing

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- The bank manager's optimal smoothing s^* should satisfy the following FOC and SOC:

$$F(x_1, s^*)(B_A - B_B) - K'(s^*) = 0$$

$$\frac{\partial}{\partial s} F(x_1, s^*)(B_A - B_B) - K''(s^*) < 0$$

  - Where $F(x_1, s) \equiv \frac{\partial}{\partial s} E[y(x_1, \tilde{x}_2, s)]$.

Introducing Government Guarantees

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- We assume that government guarantees provide an extra layer of protection in states of extreme left tail realizations of economic profits.
  - Parameters representing the distributions of actual earnings (μ, σ_A, and σ_B) remain unaltered.
  - The effect of g:
    - Censors the left tail distribution of the random variable $\tilde{x}_2$.
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- FOC and SOC become:

$$F(x_1, s^*(g), g)(B_A - B_B) - K_s(s^*(g), g) = 0$$

$$\frac{\partial}{\partial s} F(x_1, s^*(g), g)(B_A - B_B) - K_{ss}(s^*(g), g) < 0$$

  - g affects $F(x_1, s, g)$ through the direct effect on the left tail of the earnings distribution (defined by the lower integration limit g) and through an indirect effect on the manager's endogenous choice of $s^* = s^*(g)$.

Result and Predictions

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- **Main result:** Simple combination of SOC and the effects of g (pricing and monitoring costs):

$$\underbrace{\left\{F_s(x_1, s^*(g), g)(B_A - B_B(g)) - K_{ss}(s^*(g), g)\right\}}_{SOC\ (<0)} \frac{d}{dg} s^*(g) =$$

$$= \underbrace{\frac{B_B'(g) K_s(s^*(g), g)}{B_A - B_B(g)} - F_g(x_1, s^*(g), g)(B_A - B_B(g))}_{Marginal\ benefit\ (>0)} + \underbrace{K_{sg}(s^*(g), g)}_{Marginal\ cost\ (<0)}$$

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- $\frac{d}{dg} s^*(g) < 0$ as long as the RHS is positive.

Testable Implications

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- A voluminous literature documents that banks engage in earnings management using loan loss provisions (LLP):
  - Greenawalt and Sinkey (1988); Moyer (1990); Scholes et al. (1990); Ahmed et al. (1999); Fonseca and González (2008); Pérez et al. (2008); Gebhardt and Novotny-Farkas (2011); Bushman and Landsman (2010); Beatty and Liao (2014).

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- Empirically measuring earnings smoothing:
  - Typically proxied by a statistical association between banks' LLP and banks' earnings *before* LLP and taxes (coefficient estimate of β_1):

$$llp_{i,t} = \beta_0 + \beta_1 \times EbIllp_{i,t} + \sum_j \beta_j \times X^j_{i,t} + \epsilon_{i,t}$$

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- **Our goal:** To capture how β_1 (smoothing coefficient) varies with "exogenous" changes in government guarantees.
  - In *both settings*, we interact this coefficient with:
    - "Post" — for a differences estimators approach.
    - "Post" and "Control" — for a DID framework.

Landesbanken — Background

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- German banking system:
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  - Cooperative banks.

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  - State-owned banks (Landesbanken and savings banks).
  - Cooperative banks.
- **Landesbanken:** State-owned wholesale banks, each of which is affiliated with one or more German federal states.
  - Up until 2001, they were granted two layers of government guarantees:
    - Explicit guarantee of all their liabilities ("Gewährträgerhaftung").
    - Maintenance obligation requiring owners to inject additional equity capital when necessary ("Anstaltslast").
  - Competitive advantage: high credit ratings and low funding costs.

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- In 2001, following an investigation (guarantees potentially represented state aid, violating Article 47 of the European Union Treaty), the European Commission agreed to remove creditor guaranteers (Brussels Agreement).
  - Transition period (2001–2005) where liabilities newly issued (if maturing before 2015) were still guaranteed, as well as liabilities issued before July 19, 2001 (regardless of the maturity)
  - Guarantees removed after July 18, 2005.

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- Control sample comprised of German commercial banks with a minimum of $5 billion in assets.
- Sample period: 3 years pre and 3 years post the actual removal of liability guarantees (2002–2007).
- Empirical specifications: LLP model following Fonseca and González (2008).
  - Standard errors clustered at the bank-level in all specifications.

Landesbanken — Differences Estimation

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	Treatment Criterion	
	All Landesbanken	Requiring Pre- and Post- data
$Ebllp_{i,t}$	0.0771	−0.0092
	(0.1430)	(0.0572)
$Post2005_t$	0.0017	0.0004
	(0.0099)	(0.0079)
$Ebllp_{i,t} \times Post2005_t$	0.5670***	0.6640***
	(0.1770)	(0.0796)
Coefficient estimates of bank-specific covariates omitted for presentation purposes.		
Observations	45	42
Adjusted R-squared	0.777	0.881

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	Treatment Criterion	
	All Landesbanken	Requiring Pre- and Post- data
$Ebllp_{i,t}$	0.7530***	0.7520***
	(0.1100)	(0.1110)
$Post2005_t$	−0.0080	−0.0075
	(0.0144)	(0.0145)
$Ebllp_{i,t} \times Post2005_t$	−0.7570***	−0.7560***
	(0.1160)	(0.1170)
$Landesbank_i$	0.0062***	0.0067***
	(0.0022)	(0.0021)
$Post2005_t \times Landesbank_i$	−0.0148***	−0.0154***
	(0.0021)	(0.0020)
$Ebllp_{i,t} \times Landesbank_i$	−0.6880***	−0.7440***
	(0.1470)	(0.1230)
$Ebllp_{i,t} \times Landesbank_i \times Post2005_t$	1.3710***	1.4269***
	(0.1650)	(0.1390)
Coefficient estimates of bank-specific covariates omitted for presentation purposes.		
Observations	127	124
Adjusted R-squared	0.741	0.749

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  - Decision resulted from decades of discussion and whose objective was to promote economic integration and geopolitical stability of its country members.
  - Early attemps of economic and monetary integration were unsuccessful.

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  - Early attemps of economic and monetary integration were unsuccessful.
- We consider its creation as a positive shock to government guarantees:
  - Improved creditworthiness of members' sovereign bonds spills over onto their banking sectors. (Gerlach et al., 2010; Acharya et al., 2012, 2014; Correa et al., 2014; Gandhi et al., 2017; Brunnermeier et al., 2016).
  - Increased importance of the banking sectors of member countries (Gerlach et al., 2010; Chinn and Frieden, 2012).
    - Increased the likelihood of banks receiving assistance (e.g., lower interest rates or capital infusions).

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From an economic point of view, the Euro is really interesting. In economics, we don't have very many experiments, and this is a natural experiment. Nobody in their right mind would have done it, but they did it. (...) It was a political project, not an economic one.

— Joseph Stiglitz

Stigler Center, 11/30/2016

Eurozone — Sample Selection

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- Sample selection: Based on banks headquartered in the 11 countries that joined the Eurozone in 1999.
  - First Euro Adopters (FEA): Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain.
    - Standard filters: We require banks to have at least 3 years of data, $100 million in assets and pre- and post-event data.
    - Time frame: 3 years pre and 3 years post event.

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- Three choices of control banks (or "Never Euro Adopters"):
  I. European never adopters.
  II. European never adopters + Australia, Canada, and Japan (ACJ).
  III. European never adopters + ACJ + United States.

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  - I European never adopters.
  - II European never adopters + Australia, Canada, and Japan (ACJ).
  - III European never adopters + ACJ + United States.
- We consider two different sets of bank-specific controls:
  - M1 Similar to the Landesbanken analysis (a la Fonseca and González, 2008).
  - M2 Including forward-looking, contemporaneous and lagged terms of nonperforming loans (Beatty and Liao, 2011; Bushman and Williams, 2012).

Eurozone — Differences Estimation

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	Sample 1996-2011		Placebo Tests: Sample 1995-2010		Placebo Tests: Sample 1994-1999	
	Model		Model		Model	
	(M1)	(M2)	(M1)	(M2)	(M1)	(M2)
$Ebllp_{i,t}$	0.1250***	0.1041***	0.0592	0.0453	0.0185	0.0261
	(0.0313)	(0.0399)	(0.0529)	(0.0468)	(0.0384)	(0.0377)
$Post1999_t$	0.0023*	−0.0006				
	(0.0014)	(0.0017)				
$Ebllp_{i,t} \times Post1999_t$	−0.1100**	−0.0845**				
	(0.0290)	(0.0369)				
$Post1998_t$			−0.00165	−0.0049**		
			(0.0026)	(0.0024)		
$Ebllp_{i,t} \times Post1998_t$			−0.0356	−0.0205		
			(0.0467)	(0.0391)		
$Post1997_t$					−0.0033**	−0.0056***
					(0.0015)	(0.0013)
$Ebllp_{i,t} \times Post1997_t$					0.0326	0.0202
					(0.0295)	(0.0289)
Coefficient estimates of bank-specific covariates omitted for presentation purposes.						
Observations	1,958	1,560	1,777	1,410	1,596	1,247
Adjusted R-squared	0.327	0.162	0.307	0.158	0.314	0.151

Eurozone — DID Estimation

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	Different Control Groups					
	(a) European Only		(b) Europe + ACJ		(c) Europe + ACJ + US	
	(M1)	(M2)	(M1)	(M2)	(M1)	(M2)
$Ebllp_{i,t}$	0.0407*	0.0293	0.0391*	0.0374	0.0620***	0.0780***
	(0.0223)	(0.0277)	(0.0220)	(0.0292)	(0.0206)	(0.0264)
$Post1999_t$	0.0006	−0.0015	−0.0015*	−0.0026**	−0.0013	−0.0016*
	(0.0012)	(0.0012)	(0.0009)	(0.0010)	(0.0008)	(0.0010)
$Ebllp_{i,t} \times Post1999_t$	−0.0044	0.0102	0.0055	0.0063	0.0048	0.0013
	(0.0320)	(0.0336)	(0.0307)	(0.0339)	(0.0246)	(0.0290)
FEA_i	−0.0018	−0.0200***	−0.00121	−0.0217***	−0.0004	−0.0201***
	(0.0019)	(0.0027)	(0.0017)	(0.0024)	(0.0016)	(0.0021)
$FEA_i \times Post1999_t$	0.0015	0.0015	0.0028**	0.0020	0.0027**	0.0019
	(0.0016)	(0.0017)	(0.0014)	(0.0016)	(0.0014)	(0.0016)
$Ebllp_{i,t} \times FEA_i$	0.0809**	0.0793	0.0828**	0.0741	0.0666*	0.0353
	(0.0385)	(0.0484)	(0.0384)	(0.0491)	(0.0385)	(0.0481)
$Ebllp_{i,t} \times FEA_i \times Post1999_t$	−0.0982**	−0.0983**	−0.110***	−0.100**	−0.119***	−0.0972**
	(0.0432)	(0.0499)	(0.0422)	(0.0497)	(0.0391)	(0.0469)
Coefficient estimates of bank-specific covariates omitted for presentation purposes.						
Observations	2,643	1,998	3,094	2,352	6,206	5,093
Adjusted R-squared	0.410	0.301	0.410	0.319	0.381	0.291

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Potential Concern	Additional Analysis
Eurozone creation affected macro variables (credit integration, bank competition etc.).	We augment the LLP model including interaction terms with macro and bank-specific variables.

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- We fail to find evidence that such alternative explanations are driving our results.

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  - *Explicit* (Landesbanken) vs. *implicit* (Eurozone) guarantees.
  - *Internal validity* (Landesbanken) vs. *external validity* (Eurozone).

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  - *Internal validity* (Landesbanken) vs. *external validity* (Eurozone).
- Government guarantees not only have real implications for banks' stakeholders but also affect the quality of the information reported by banks.

Thank you!

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